



Everything You Wanted to Know About
Drinking Water
Regulations

Keeping your drinking water safe

**South Dakota
Drinking Water
Program**



Revision Date: 04/10/07



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The Drinking Water Program

Mission

The mission of the Department of Environment and Natural Resources (DENR) and the Drinking Water Program is to protect public health and the environment by providing natural resources assessment, financial assistance, and regulation in a manner that promotes a successful business climate and exceeds the expectations of our customers.



The Drinking Water Program

The state of South Dakota began primary enforcement of the federal Safe Drinking Water Act in 1983. The South Dakota Drinking Water Program, part of the Department of Environment and Natural Resources, develops and enforces the [South Dakota Drinking Water Regulations](#) that apply to public water systems in the state. Approximately 662 public water systems currently exist in South Dakota. The Drinking Water Program is located in Pierre and has office personnel located in Watertown and Rapid City. A Who's Who in the Drinking Water Program is found on page 35.



Introduction

Everything You Wanted To Know About Drinking Water (but were afraid to ask)

This pamphlet contains various information about your drinking water and how it is regulated and maintained to protect your health. Information is broken down within this pamphlet by regulatory groups as determined by the Environmental Protection Agency (EPA). Groups such as Inorganic Contaminants and Synthetic Organic Contaminants can be found within this pamphlet. Each of these groups are broken down into their individual regulatory contaminants. Information about these regulated contaminants can be found in this pamphlet by referring to the Table of Contents on page 3.

Further Information

If you need further information or cannot find what you are looking for here, please contact us at:

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Inorganic Contaminants

Inorganic Contaminants (IOCs) are elements or compounds found in water supplies and may be natural in the geology or caused by activities of man through mining, industry or agriculture. It is common to have trace amounts of many Inorganic Contaminants in water supplies. Amounts above the Maximum Contaminant Levels may cause a variety of damaging effects to the liver, kidney, nervous system, circulatory system, blood, gastrointestinal system, bones, or skin depending upon the inorganic contaminant and level of exposure. Some Inorganic Contaminants are more damaging to infants and pregnant women. Because of some special aspects of the rules for asbestos, fluoride, and nitrates, separate pages are prepared for them in this booklet.

Do the inorganic contaminant regulations apply to my water system?

Yes, all community and non-transient non-community public water supply systems must monitor for regulated Inorganic Contaminants in their water supply. At the present there are 15 regulated Inorganic Contaminants (including fluoride, arsenic, and nitrates).

Frequency of sampling

- Samples are to be taken at the entry point, where the source enters the distribution system after treatment
- Samples must be taken to an EPA

approved laboratory for analysis

- Sampling continues yearly or every three years for currently regulated Inorganic Contaminants.
 - Ground water systems – sample every 3 years
 - Surface water supplies – sample annually
- Waivers are available to reduce inorganic contaminant sampling to once every nine years

If your water system exceeds any of the Maximum Contaminant Levels they must:

- Notify the Drinking Water Program and complete Public Notices as required.
- Work with the Drinking Water Program to determine the best way to reduce the level of contaminate in your water supply. A variety of options can be considered including a new treatment process, mixing your contaminated supply with another supply that does not exceed the Maximum Contaminant Level, or using a new source of water.
- Contact resource agencies listed in the Resource Agencies Section of this pamphlet for help in planning and finding financing for your system improvements.
- Monitor quarterly.



Inorganic Contaminants

Contaminants	Maximum Contaminant Level
Antimony	0.006 mg/L
Arsenic	0.01 mg/L
Asbestos	7 million fibers/L
Barium	2 mg/L
Beryllium	0.004 mg/L
Cadmium	0.005 mg/L
Chromium	0.1 mg/L
Cyanide	0.2 mg/L
Fluoride	4.0 mg/L
Mercury	0.002 mg/L
Nickel	0.1 mg/L
Nitrate	10 mg/L
Nitrite (as N)	1 mg/L
Nitrate & Nitrite (combined)	10 mg/L
Selenium	0.05 mg/L
Thallium	0.002 mg/L



Additional Information

The rules for Inorganic Contaminants are contained in 40 CFR 141.11, 141.23, 141.62.

Asbestos

Asbestos is a naturally occurring fibrous mineral that is resistant to heat and most chemicals. It has been used in more than 3,000 different products and in the construction industry. Asbestos is combined with the other 14 Inorganic Contaminants regulated in drinking water. It may occur in drinking water by a corrosive action on asbestos cement pipe contained in a water system. Asbestos has been known to be a carcinogen if subjected to long-term exposure above the Maximum Contaminant Level (MCL). Short-term exposure at levels above the Maximum Contaminant Level is not known to cause any health problems.



Do the Asbestos regulations apply to my water system?

Yes, if you are served by a community or non-transient non-community public water system, the asbestos regulations apply to your system. If asbestos is unlikely to occur in your water source and your water system does not have asbestos cement pipe, your system may be granted a sampling waiver. A public water system that is granted a waiver will not have to monitor for asbestos. If your system does have asbestos cement pipe and your water is non-corrosive, your system may also be eligible for a waiver.

Frequency of Sampling

One sample is required every nine years. Samples are taken at sites served by asbestos-cement pipes. Waivers are available to eliminate this sampling.

Maximum Contaminant Level

The Maximum Contaminant Level for asbestos is 7 million fibers/liter (longer than 10 micrometers). If your system is required to test for asbestos and it has asbestos cement pipe, the sample will be taken at a tap served by the AC pipe. If your system has asbestos in the source water only, then the test will be at the source. If the sample is over the Maximum Contaminant Level, then quarterly testing is required.

Actions your water system should be taking

Complete the initial monitoring, apply for a waiver, and perform a vulnerability assessment.



Asbestos

If your tests indicate levels of asbestos higher than the maximum contaminant level (MCL), your system is in violation and they must:

- Test quarterly,
- Notify the Drinking Water Program and complete public notification as required,
- Work with the Drinking Water Program to determine if asbestos is from your source and/or is being leached from your asbestos cement pipe. Plan a corrective action.
- The following treatment methods have been approved by EPA for removing asbestos: Coagulation/Filtration, Direct and Diatomite Filtration, Corrosion Control.
- Contact resource agencies listed in the resource agencies section of this pamphlet for help in working out financial needs.

If the level of asbestos exceeds the Maximum Contaminant Level, the system must notify the public within 30 days by mail or direct home delivery. The public notice must be repeated every quarter that the violation exists.

Other important considerations

There is no plan to call for the removal of existing pipe but a water system may need to provide corrosion control if there is asbestos cement pipe in their system. More important may be the need to plan for materials and procedures to repair existing asbestos cement pipe in the future.

The greatest risk related to asbestos cement pipe is to the maintenance worker who is repairing or otherwise coming into contact with the pipe. Inhalation of the dust (fibers) from cutting the pipe is particularly hazardous. The Occupational Safety and Health Administration (OSHA) of the Department of Labor have published rules concerning occupational exposure to asbestos. If you work with asbestos cement pipe, contact your state Department of Labor for information on these rules.

Additional Information

The rules for Asbestos are contained in 40CFR 141.23 (b).

The rules of OSHA on Occupations exposure to Asbestos are contained in 29 CFR 1910 and 1926.



Nitrates/Nitrites

Nitrates and nitrites are nitrogen-oxygen chemical units which combine with various organic and inorganic compounds. Once taken into the body, nitrates are converted into nitrites. Nitrates occur in the soil, animal excreta, crop residues, human wastes, some industrial wastes and nitrogen fertilizers. They are soluble and move with water. Excessive levels of nitrate in drinking water can cause serious illness in infants by interfering with the oxygen-carrying capacity of the child's blood. Symptoms include shortness of breath and blueness of the skin. Nitrates and nitrites also have the potential, after a lifetime of exposure, to cause diuresis, increased starchy deposits, and hemorrhaging of the spleen.

Do the Nitrate/Nitrite regulations apply to my water system?

Yes, all public water supply systems must monitor for nitrates and nitrites in their water supply.

Frequency of Sampling

Nitrate and Nitrite samples are required to be taken at each entry point, the point where the source water enters the distribution system after treatment. Nitrite samples must be taken every 3 years. Nitrate samples in surface water must initially be taken quarterly. After a year of safe samples, surface water systems samples must be taken annually. Ground water systems must sample for nitrate annually. Nitrate levels have been known to fluctuate so yearly monitoring is critical.

If the Maximum Contaminant Level is violated your water system must:

- Notify the Drinking Water Program and complete Public Notification as required.
- Take a confirmation sample for nitrate and nitrite within 24 hours.
- Work with the Drinking Water Program to determine the best way to reduce the level of contaminant in your water supply. Treatment processes, mixing the contaminated supply with another supply that does not exceed the Maximum Contaminant Level, or obtaining a new source of water are options to consider.
- Enter into an agreement with the Drinking Water Program to allow the water system to continue to use the water supply while the solutions to the Maximum Contaminant Level violation are being explored and any needed financing is being planned.
- Contact resource agencies listed in the Resource Agencies Section of this pamphlet for help in planning and finding financing for your system improvements.
- Monitor quarterly.



Nitrates/Nitrites

Contaminant	MCL * (mg/L)	Potential health effects from ingestion of water	Sources of contaminant in drinking water
Nitrate (measured as nitrogen)	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite (measured as nitrogen)	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits

* Maximum Contaminant Level



Fluoride

Fluoride is a compound that contains an ionic form of the element fluorine. Fluoride occurs naturally in many water sources and is added in the treatment process by many public water systems. Fluoride in amounts between 0.9 and 1.7 milligrams per liter (mg/L) have been beneficial in reducing tooth decay. Amounts above 4.0 mg/L may cause bone disease. Amounts greater than 2 mg/L and less than 4 mg/L can cause discoloration of teeth.

Does the fluoride regulation apply to my water system?

Yes, but only community public water systems must test for fluoride.

Frequency of Sampling

Sampling must be done yearly if systems use surface water, or every three years if they use ground water. If your system is a community public water system over 500 and is therefore required to adjust fluoride levels, then monthly samples are required.

Maximum Contaminant Level

Maximum Contaminant Level = 4.0 mg/L (secondary standard suggested level = 2.0 mg/L).

If your tests show levels less than the 2.0 mg/L, your water system needs to do nothing about fluoride.

Actions your water system should be taking

If tests indicate fluoride levels between 2.0 and 4.0 mg/L, your water system should check with the Drinking Water Program to see if any changes in operations can be made to lower the fluoride level. Since this is not an Maximum Contaminant Level violation, immediate action is not required, but planning should be undertaken to reduce levels below 2.0 mg/L. The Drinking Water Program may require more frequent sampling to monitor the fluoride level. A quarterly public notice, with mandatory health effects language is required for levels above 4.0 mg/L. An annual public notice must be issued if the level is between 2.0 and 4.0 mg/L.



Fluoride

If tests indicate fluoride levels above 4.0 mg/L, your water system is in violation of the Maximum Contaminant Level and they must:

- Contact the Drinking Water Program. They will assist with forming the contents of a public notice that is required for their customers (see Public Notification section).
- Work with the Drinking Water Program and their water manager to plan for a change in your water supply or treatment system to lower the fluoride levels.
- Seek help through other resources agencies (listed in the Resource Agencies Section of this pamphlet) for help in finding financial resources if need to make water system changes.
- Continue quarterly testing, as suggested or required by the state agency to monitor fluoride levels while they are working on solutions. Notify the public quarterly, as required.

Solutions to fluoride Maximum Contaminant Level violations for very small water systems usually involve finding and using a new water source or mixing existing sources to reduce the fluoride level. Removing fluoride through treatment is usually cost prohibitive for a very small system.

Your local dentist or state dental association will have information available on the beneficial effects of correct amounts of fluoride in your drinking water.

Additional Information

The rule for fluoride is contained in 40CFR 141.11, 141.23, 141.62.



Disinfection and Disinfection by-products

Disinfectants (such as chlorine) are the primary defense against diseases caused by microbiological contaminants in public water systems. Although disinfection is the single most important treatment technique in use in public water supplies, the disinfectants themselves can react with organic materials in water supplies to form disinfection by-products (DBPs) which may prove to contaminate the water with compounds that increase cancer risk.

Disinfectants

Many water supplies add a disinfectant to drinking water to kill germs such as *giardia* and *E. coli*. Especially after heavy rainstorms, your water system may add more disinfectants to guarantee that these germs are killed. Common disinfectants are:

- Chlorine
- Chloramine
- Chlorine dioxide

Disinfection by-products

Disinfection by-products form when disinfectants are added to drinking water to kill germs that react with naturally-occurring organic matter in water.

- Total trihalomethanes (THM)
- Haloacetic acid (HAA5)
- Bromate
- Chlorite

Do the disinfection and disinfection by-products regulations apply to my water system?

Not necessarily. Present regulations only apply to systems adding a disinfectant to their water supplies. However, future regulations will require all systems that purchase disinfected water to meet regulations as well.



Disinfection and Disinfection by-products

Actions your water system should be taking

If your water system is adding a disinfectant, they must start regular disinfectant residual tests (weekly or monthly) at some consumer taps to determine how much disinfection is available at the "end-of-the-line" in your system. A free chlorine residual of at least 0.2 mg/L should be maintained. This will help them plan for modifications in your disinfection to meet any new standards that are required.

Frequency of Sampling

GUDISW: Groundwater under direct influence of surface water

*Sample taken in month with the warmest water temperature.

System type	Population	Monitoring frequency
Surface/GUDISW	>10,000	4/plant/quarter
Surface/GUDISW	500-9,999	1/plant/quarter
Surface/GUDISW	<500	1/plant/year*
Groundwater	>10,000	1/plant/quarter
Groundwater	<10,000	1/plant/year*



Radiological Contaminants

Radiological contaminants are radioactive particles that occur naturally in areas of uranium and radium deposits and in waste from man-made nuclear reactive processes. Radiological contaminants, even in very small concentrations, pose a cancer risk. The implementation of the Radionuclides Rule will result in the reduced exposure to uranium for 620,000 persons, resulting in protection from toxic kidney effects of uranium and a reduced risk of cancer.

Does the radiological contaminant regulation apply to my water system?

Yes, radiological contaminants have been regulated since 1976 with Maximum Contaminant Levels currently set for 5 types. All community public water systems must test for radiological contaminants.

Frequency of Sampling

Samples must be taken at each entry point.

Initial monitoring

Four consecutive quarters of monitoring for:

Gross Alpha, Combined Radium-226/228, and Uranium .

No monitoring required for most com-

munity water systems for:

Beta Particle and Photon Radioactivity

Vulnerable community water systems must sample quarterly for Gross beta and annually for Tritium and Strontium-90.

Reduced Monitoring

Gross Alpha, Combined Radium-226/228, and Uranium

- If the average of the initial monitoring results for each contaminant is below the detection limit: One sample every 9 years.
- If the average of the initial monitoring results for each contaminant is greater than or equal to the detection limit, but less than or equal to one-half the Maximum Contaminant Level: one sample every 6 years.
- If the average of the initial monitoring results for each contaminant is greater than one-half the Maximum Contaminant Level but less than or equal to the Maximum Contaminant Level: one sample every 3 years.

Beta Particle and Photon Radioactivity

- If the running annual average of the gross beta particle activity minus the naturally occurring potassium-



Radiological Contaminants

Increased Monitoring

Gross Alpha, Combined Radium-226/228, and Uranium

- A system with an entry point result above the Maximum Contaminant Level must return to quarterly sampling until 4 consecutive quarterly samples are below the Maximum Contaminant Level.

Beta Particle and Photon Radioactivity

- If the gross beta particle activity minus the naturally occurring potassium-40 activity exceeds 50 pCi/l, the system must sample at the initial monitoring frequency

If your tests indicate levels of radiological contaminants higher than the Maximum Contaminant Level, your water must:

- Ask the Drinking Water Program if they should resample to confirm the test results. The State may also require your system to continue quarterly sampling until the Maximum Contaminant Level is met.
- Follow the Drinking Water Program's instructions regarding when and what type of public notice they need to give.
- Enter into an agreement with the Drinking Water Program to allow the water system to continue to use the water supply while solutions to the Maximum Contaminant Level violation are being explored and any needed financing is being planned.
- Start working with the Drinking Water Program to consider options to eliminate the radiological contaminants from your system. In nearly all very small community water systems, finding a different source of water supply is the most economical solution to a radionuclide problem. Radon can be removed with aeration. Any treatment may produce radioactive wastes that will be difficult to dispose of.
- Agencies listed at the end of this section may be able to help your water system to arrange for financing to solve the violation problem.
- Remember that exposure to radiological contaminants at levels found in water is a risk over long term exposure. It is not an acute risk for short periods of time. Proceed to work out a reasonable and affordable solution for your drinking water supply.



Radiological Contaminants

Contami- nant	MCL*	Potential Health Effects	Sources In Drinking Water
Gross Alpha Particles	15 pico- curies per Liter (pCi/L)	Increased risk of cancer	Erosion of natu- ral deposits of certain minerals that are radio- active and may emit a form of radiation known as alpha radia-
beta particles and photon emitters*	4 mil- lirems per year	Increased risk of cancer	Decay of natu- ral and man- made deposits of certain min- erals that are radioactive and may emit forms of radiation known as pho- tons and beta
Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer	Erosion of natu- ral deposits
Uranium	30 ug/L as of 12/08/03	Increased risk of cancer, kid- ney toxicity	Erosion of natu- ral deposits

*Maximum Contaminant Levels

These are the current Maximum Contaminant Levels for radiological contaminants and the levels that are proposed. The units of measure are peculiar to radioactivity and represent very small quantities. A total of 168 individual beta particle and photon emitters may be used to calculated compliance with the Maximum Contaminant Level



Synthetic Organic Contaminants

Synthetic Organic Contaminants (SOCs) are man-made compounds used for variety of industrial and agricultural purposes. This group of contaminants includes pesticides, PCB, and dioxin. Synthetic Organic Contaminant health effects include damage to the nervous system, kidneys and cancer risks.

Do the Synthetic Organic Contaminant regulations apply to my water system?

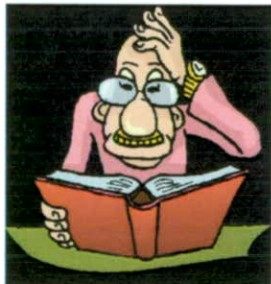
Yes, this regulation applies to community and non-transient non-community (NTNC) water systems.

Frequency of Sampling

All community and non-transient non-community systems must test each entry point initially for four consecutive quarters. If there are no detections, then they can be reduced to once every three years. For systems serving more than 3300 people, they must submit two consecutive quarterly samples every three years for each entry point. Systems serving less than 3301 are required to submit one sample for each entry point once every three years. This sampling can be eliminated through waivers.

Actions your water system should be taking

- Complete any sampling for currently regulated Synthetic Organic Contaminants as required.
- Apply for a "Vulnerability Waiver" if your water system can show that their water supply is not vulnerable to Synthetic Organic Contaminant contamination.



- Apply for a "Use Waiver" if your water system can show that regulated Synthetic Organic Contaminants were not used within a certain radius of your sources.



Synthetic Organic Contaminants

If the annual average of your water system's tests indicate levels of a **Synthetic Organic Contaminant** higher than the maximum contaminant level (**MCL**), your system is in violation of the **Maximum Contaminant Level**. Your water system must:

- Continue quarterly sampling (at times of highest vulnerability, i.e. after fertilizer application and a rain).
- Notify the Drinking Water Program and complete public notices as required.
- Work with the Drinking Water Program to determine how Synthetic Organic Contaminants are getting into your water supply. If possible, eliminate the source of contamination.
- If treatment is required to remove the Synthetic Organic Contaminants, work with the Drinking Water Program to choose the best available technology for treatment. Filtering through granular activated carbon is suggested for most Synthetic Organic Contaminants. Packed tower aeration and polymer addition practices are used for some.
- Contact resource agencies listed in the Resource Agencies Section of this pamphlet for help in working out financial needs.
- Change water sources if that is the most economical solution in situations where available.

Maximum Contaminant Level

The Maximum Contaminant Levels for the Synthetic Organic Contaminants are listed on the following page.

Additional Information

Check out 40 CFR 141.24(h)(5) for information on waivers.



Synthetic Organic Contaminants

Contaminant	Maximum Contaminant Level (MCL)
	mg/L
Alachlor	0.002
Aldicarb	0.003
Aldicarb sulfoxide	0.004
Aldicarb sulfone	0.002
Atrazine	0.003
Carbofuran	0.04
Chlordane	0.002
Dibromochloropropane	0.0002
2,4-D	0.07
Ethylene dibromide	0.00005
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Methoxychlor	0.04
Polychlorinated	0.0005
Pentachlorophenol	0.001
Toxaphene	0.003
2,4,5-TP	0.05
Benzo[a]pyrene	0.0002
Dalapon	0.2
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.006
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Glyphosate	0.7
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Oxamyl (Vydate)	0.2
Picloram	0.5
Simazine	0.004
2,3,7,8-TCDD (Dioxin)	3x10-8



Security Of Your Drinking Water

Physical facilities

The following steps should be implemented by your water system:

- A fence or wall should surround the facility and key components (i.e. lift stations, well heads, etc.).
- All access gates should be kept locked.
- All doors and windows should be kept locked.
- All utility vehicles should be kept locked and keys should be kept in a secure location.
- Alarms should be installed in buildings and critical structures to detect intrusion.
- Security lighting should be installed and working.
- A backup power supply should be available.
- Access to sewers in the vicinity of government buildings, financial districts and hospitals should be restricted.
- Close-up visual inspections of critical structures should be made routinely.
- Ensure that all valves work and that their locations are known.
- Records of all activities relating to visitation, security checks, operation and maintenance should be kept.
- Access to chemicals should be restricted.
- All chemicals should be accounted for.
- All delivery vehicles should be inspected.
- A distant delivery area for receiving and screening packages prior to distribution within the facility should be designated.
- All visitors should be supervised.
- A public announcement system should be available within the facility to notify employees should a terrorist or emergency incident occur.



Security Of Your Drinking Water

Neighborhood watch program

A neighborhood watch program should be implemented. The following suspicious activities should be reported:

- Unfamiliar person loitering around facility or key components
- Unfamiliar person taking photos or making detailed drawings of facility or key components
- Unfamiliar person asking detailed questions about treatment processes, staff routines, etc.
- Any person discussing a plan to break-in or attack a facility or key component

Homeland Security in South Dakota

1-866-HOM-LAND

<http://www.state.sd.us/homeland/>

Emergency contact numbers

Available on page 38 "Hotlines and Additional Information"

Additional Information

See DENR pamphlet titled "Providing Security for Water and Wastewater Infrastructure in South Dakota"





Coliform Bacteria Monitoring

Bacteria from sewage and animal wastes present the most frequent and immediate health risks to public water supplies. Coliform bacteria, specifically the presence of fecal and *E. coli* bacteria, are used as the best and most easily tested for indicator of potentially harmful bacteria in the water.

Does the Coliform Monitoring rule apply to my water system?

Yes, all public water systems must submit samples for coliform bacteria testing on a regular basis. Failure to submit samples, meet the Maximum Contaminant Level or report non-compliance are all violations of the rule.

Maximum Contaminant Levels

The Maximum Contaminant Level is based on the presence or absence of total coliforms in a sample. Any presence of coliform bacteria in two or more samples is a violation of the rule.

Frequency of Sampling

Monthly samples must be collected from assigned sites that are representative of the water across the entire distribution system. The number of samples is based on population and can vary from 1 to 480 samples per month.

If your system does not detect coliform bacteria they must:

- Continue to submit regular sam-

ples and review results.

- Maintain good operation and maintenance programs for your water system including regular flushing at fire hydrants and on dead ends.
- If your system chlorinates, continue to maintain a free chlorine residual of 0.3 mg/L at all points in your distribution system.

If your system has a coliform positive sample result they must:

- Immediately collect and submit four repeat samples. These samples should be taken at the original location, one upstream, one downstream and the fourth either upstream or downstream.
- Carefully review the sampling procedures to be sure they are not accidentally contaminating the samples.
- Call the Drinking Water Program and ask for help to locate any possible sources of contamination.
- Follow the Drinking Water Program's direction in issuing a public notice.
- Immediately correct any problems causing contamination.
- The month following a violation, they must collect five routine samples.



Volatile Organic Contaminants

Volatile Organic Contaminants (VOCs) are man-made compounds used for a variety of industrial and manufacturing purposes. Volatile Organic Contaminants are not readily dissolved in water and will tend to separate from the water forming gasses. Volatile Organic Contaminants have various effects on the liver, kidneys, nervous system and some pose a cancer risk.

Do the Volatile Organic Contaminant regulations apply to my water system?

Yes, all community and non-transient non-community public water systems must monitor for regulated Volatile Organic Contaminants in their water supply.

Frequency of Sampling

All community and non-transient non-community systems must test each entry point initially for four consecutive quarters. If there are no detections, they can be reduced to annual monitoring. Groundwater systems with no detections for three years of annual sampling, can be reduced to once every three years and can qualify for a waiver. Groundwater systems with a waiver must sample once every six years. Surface water systems must continue annual monitoring unless they get a waiver, then they must monitor once every three years.

Actions your water system should be taking

- Complete any sampling for the first round of four quarterly samples for currently regulated Volatile Organic Contaminants as required.
- Apply for a "Groundwater Waiver" or "Surface Water Waiver".

If the annual average of your water system's tests indicate levels of a Volatile Organic Contaminant higher than the maximum contaminant level (MCL), your system is in violation of the Maximum Contaminant Level. Your water system must:

- Continue quarterly sampling (at times of highest vulnerability).
- Complete Public Notices as required.
- Work with the State to determine how Volatile Organic Contaminants are getting into your water supply. If possible, eliminate the source of contamination.



Volatile Organic Contaminants

- If treatment is required to remove the Volatile Organic Contaminant, choose the best available technology for treatment. Filtering through Granular Activated Carbon and Packed Tower Aeration are common treatments for most Volatile Organic Contaminant removal. Contact resource agencies listed in the Resource Agencies Section of this pamphlet for help in working out financial needs.
- Consider changing the source of your water supply as one option. This may be the most economical solutions when available.

Contaminant	Maximum Contaminant Level (MCL)
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	mg/L
Vinyl chloride	0.002
Benzene	0.005
Carbon tetrachloride	0.005
1,2-Dichloroethane	0.005
Trichloroethylene	0.005
para-Dichlorobenzene	0.075
1,1-Dichloroethylene	0.007
1,1,1-Trichloroethane	0.2
cis-1,2-Dichloroethylene	0.07
1,2-Dichloropropane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
o-Dichlorobenzene	0.6
Styrene	0.1
Tetrachloroethylene	0.005
Toluene	1
trans-1,2-Dichloroethylene	0.1
Xylenes (total)	10
Dichloromethane	0.005
1,2,4-Trichlorobenzene	0.07
1,1,2-Trichloroethane	0.005

Additional information

Waiver information can be found at 40 CFR 141.249(f)(7)



Lead and Copper Rule

Lead and copper are inorganic contaminants that are occasionally found in water supplies and are frequently leached out of plumbing in water systems that have corrosive water. Lead can cause central and peripheral nervous system damage, kidney effects and can be highly toxic to infants and in the developing fetus of pregnant women. Copper causes taste problems and stains porcelain and can also cause stomach and intestinal distress.

Does the lead and copper rule apply to my water system?

Yes, all community and non-transient non-community public water supplies are required to test for lead and copper according to the following schedule.

Frequency of Sampling

Samples must always be taken at the chosen sites. The chosen sampling sites for lead and copper differ from the sites chosen for bacteriological sampling. Sampling sites for lead and copper are chosen by the age of the houses and the plumbing connected to the system. The sites chosen are often sites with the highest risk of lead and copper contamination. A site may have higher risk of contamination if there are lead service lines, copper plumbing, or lead solder. A list of the sites for each system is available from the Drinking Water Program should there be any question.

Samples are "first-draw" tap water samples taken in 1 liter bottles. These samples must be taken to a state approved lab. Samples must be collected from the kitchen or bathroom cold water tap. Lead and copper samples have a 14 day time frame between the time the samples are drawn and when they need to be preserved at the lab. Generally, homeowners may take the samples themselves rather than the operator.

Initially, samples must be taken for 2 consecutive six-month periods for one year. The six-month periods are from January 1 to June 30 and July 1 to Dec 31. If the 90th percentile levels of the both sets of samples are $\frac{1}{2}$ the action level or below, the monitoring may be reduced to samples every 3 years. If the 90th percentile levels of the past samples are below the action level but above $\frac{1}{2}$ of the action level, the sampling frequency may be reduced to annual.



Lead and Copper Rule

If the 90th percentile does not exceed the action level for two consecutive annual monitoring periods, sampling frequency may be reduced to once every three years.

How to compute the 90th percentile

1. List the results from the lead and copper samples taken during a six-month period, numbering them in ascending order from lowest, being 1, to highest. The number assigned to the sample with the highest concentration must be equal to the total number of samples taken.
2. Multiply the total number of samples taken by 0.9 For example, if there are 20 samples, $20 \times 0.9 = 18$
3. The number that results from step 2 is the concentration in the 90th percentile used for comparison to the action level.
4. For water systems serving fewer than 100 people that collect only five water samples, the 90th percentile is measured by the average of the highest and the second highest concentrations.

Note: this computation can also be easily done by a representative in the Drinking Water Program and is in no way required to be complete upon submission of results.

Sampling requirements by population

System (population)	Number of sampling sites	Number of sampling sites
>100,000	100	50
10,001 to 100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
≤100	5	5



Lead and Copper Rule

Action Levels, Health Effects and Sources

The Lead Action Level is 0.015 mg/L. Adverse health effects of elevated lead levels for children include: altered physical and mental development; interference with growth; deficits in IQ, attention span and hearing; and interference with blood synthesis. In adults, the adverse health effects of elevated lead levels can increase blood pressure and shorten the gestational period.

The Copper Action Level is 1.3 mg/L. Adverse health effects of elevated copper levels include: Stomach and intestinal distress and Wilson's disease.

Elevated lead and copper levels in drinking water are usually caused by corrosion of interior household pipes and fixtures (i.e. lead solder, lead or copper pipes and brass faucets).

If your test results are higher than the action levels listed above your water system must:

- Notify the Drinking Water Program and complete the Public notices as required.
- Work with the state agency to determine the best way to reduce the level of contamination in your water supply.
- Begin water quality parameter monitoring.
- Explore treatments to reduce corrosion rates.
- Notify the public periodically, as required.

Additional information

More information on Lead contamination can be found in SD state pamphlet "Lead and your Drinking Water"



Annual Drinking Water Report

The U.S. Environmental Protection Agency (EPA) is requiring water suppliers to put annual drinking water quality reports into the hands of their customers. These consumer confidence reports or annual drinking water reports will enable Americans to make practical, knowledgeable decisions about their health and their environment.

EPA developed this rule in consultation with water suppliers, local governments, environmental groups, risk communication experts, and others during many public meetings in 1996 and 1997. The Consumer Confidence Report (Drinking Water Report) is the centerpiece of many provisions adopted in the 1996 Amendments to the Safe Drinking Water Act to give consumers more information on their drinking water and unprecedented opportunities to get involved in protecting it.

The Drinking Water Reports include the following information:

- the lake, river, aquifer, or other source of the drinking water;
- a brief summary of the susceptibility to contamination of the local drinking water source, based on the source water assessments that states are completing over the next five years;
- how to get a copy of the water system's complete source water assessment;
- the level (or range of levels) of any contaminant found in local drinking water, as well as EPA's health-based standard (maximum contaminant level) for comparison;
- the likely source of that contaminant in the local drinking water supply;
- the potential health effects of any contaminant detected in violation of an EPA health standard, and an accounting of the system's actions to restore safe drinking water; information about how vulnerable populations can avoid *Cryptosporidium*.
- the water system's compliance with other drinking water-related rules;
- an educational statement for vulnerable populations about avoiding *Cryptosporidium*;
- educational information on nitrate, arsenic, or lead in areas where these contaminants are detected above 50% of EPA's standard;
- phone numbers of additional sources of information, including the water system and EPA's Safe Drinking Water Hotline (800 426-4791).



Public Notification

With the enactment of the Safe Drinking Water Act, Congress required that public drinking water systems notify their customers when drinking water standards are violated. The purpose of public notification is to inform consumers of any potential adverse health effects and to describe what steps consumers can take to minimize the impact. It should also educate the consumer about the needs of the public water system to assure the delivery of safe drinking water.

Do the public notification rules apply to my water system?

Yes, the Safe Drinking Water Act requires owners (or operators) of all public drinking water systems to notify the people they serve if certain violations of the National Primary Drinking Water Regulations occur.

Timetable

Public Notification rule is now in effect for all contaminants that require monitoring. As new contaminants are regulated, health effects language for public notification is added.

Types of violations requiring Public Notification

There are six violations or events that require Public Notification:

1. Failure to comply with an applicable maximum contaminant level (MCL).
2. Failure to comply with a predescribed treatment technique.
3. Failure to perform water quality monitoring (testing) as required by the regulations.
4. Failure to comply with testing procedures as described by a South Dakota Drinking Water Standard.
5. Issuance of a variance or an exemption.
6. Failure to comply with the requirements of any schedule that has been set under an agreement with the department.



Public Notification

Notification Procedures

Notice to the public by public water systems must be made by direct home delivery within 24 hours, 30 days, or one year after being notified by the Department of the failure or violation. The severity of the situation dictates the timeframe of the public notice. A "Certificate of Public Notice Distribution" must also be submitted, along with a copy of the public notice, within 10 days of issuance.

Actions your water system should take:

- If your water system is informed of test results that indicate they are in violation of an Maximum Contaminant Level or are informed of another violation, they must immediately contact the State and ask their direction in proceeding with public notification (Note: the State may declare a sample invalid or require a check sample before confirming a violation).
- A copy of each public notice must be sent to the Drinking Water Program within ten days of issuance. Where the notice was made by newspaper, a copy of the actual newspaper advertisement must be sent.

Notice contents

The notice provides a clear and readily understandable explanation of the:

- violation and when it occurred
- potential adverse health effects (mandatory health effects language)
- population at risk
- steps the system is taking to correct the violation
- necessity of seeking alternative water supplies (if any)
- preventative measures the consumer should take until the violation is corrected
- name, address, and telephone number of water system contact person



Surface Water Treatment

Does the Surface Water Treatment Rule apply to my water system?

Yes, it applies to all Public Water Supply Systems (community and non-community) using a surface water source (i.e. water open to the atmosphere and subject to surface runoff) or groundwater source under the direct influence of surface water.

Surface Water Treatment

1. As of December 17, 2001, the turbidity standard has been reduced to 0.3 turbidity units (NTU).
2. New filtration criteria, disinfection criteria and monitoring requirements are effective as of December 17, 2001.

For surface water systems, chlorine is monitored at the entry point and throughout the distribution system.

Actions your water system should be taking

- Public water systems must be operated by personnel that meet qualifications specified by the State or EPA. The water purveyor is required to monitor the water system, by sampling and testing the water, for compliance to the Maximum Contaminant Levels listed for the public water system category (community, non-community, etc.).
- Treatment must remove or inactivate at least 99% of *Cryptosporidium*, 99.9% of *Giardia Lamblia* cysts, and 99.99% of viruses; all systems must disinfect, and filter. Criteria must be met for determining if treatment (turbidity removal, disinfection) is adequate for filtered systems.
- System using surface water must send in monthly reports to the State documenting compliance with treatment and monitoring requirements.

Water users must be informed through public notification, of any violation.



General Information

Operator Certification

As of July 1, 2000 the following systems must be managed and operated by a state certified water operator:

- All community and non-transient non-community water systems
- Any transient non-community water systems using surface water or disinfection equipment

Training courses are provided by the SD Rural Water Association and exams are given 12-18 times per year across the state. There are experience and educational prerequisites to take certification exams. There is an operator certification web site at <http://www.state.sd.us/opercert>.

Waivers

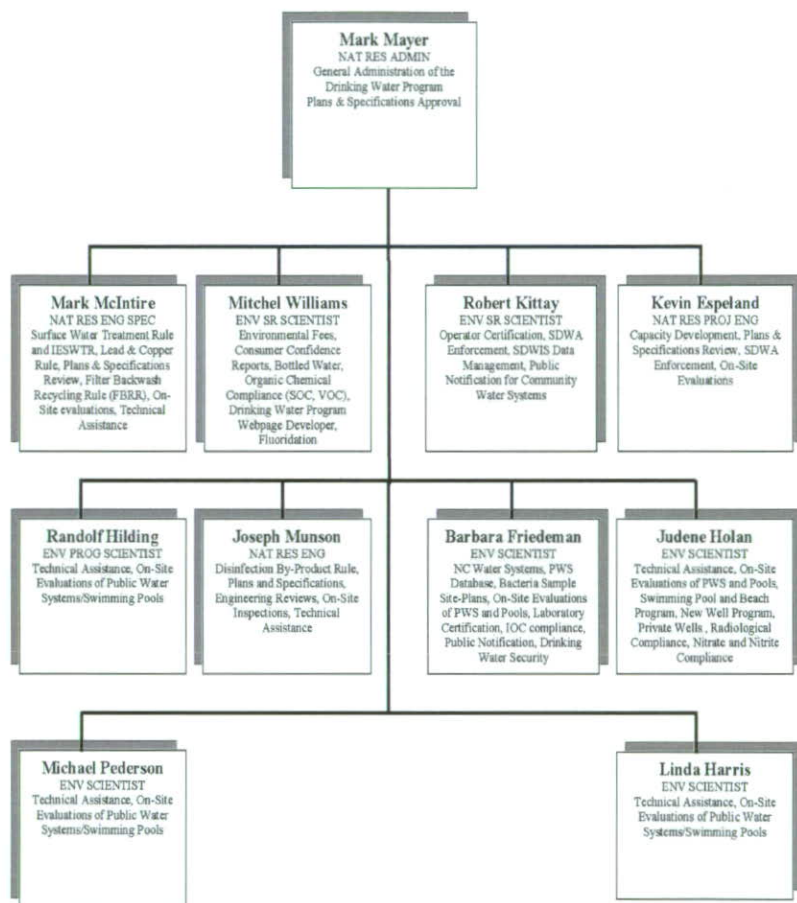
Monitoring waivers are available for the following contaminant groups:

- Asbestos
- Inorganic Contaminants (IOC's)
- Synthetic Organic Contaminants (SOC's)
- Volatile Organic Contaminants (VOC's)

Forms and other information can be found on the internet at www.state.sd.us/denr/des/drinking/dwprg.htm



Who's Who In Drinking Water



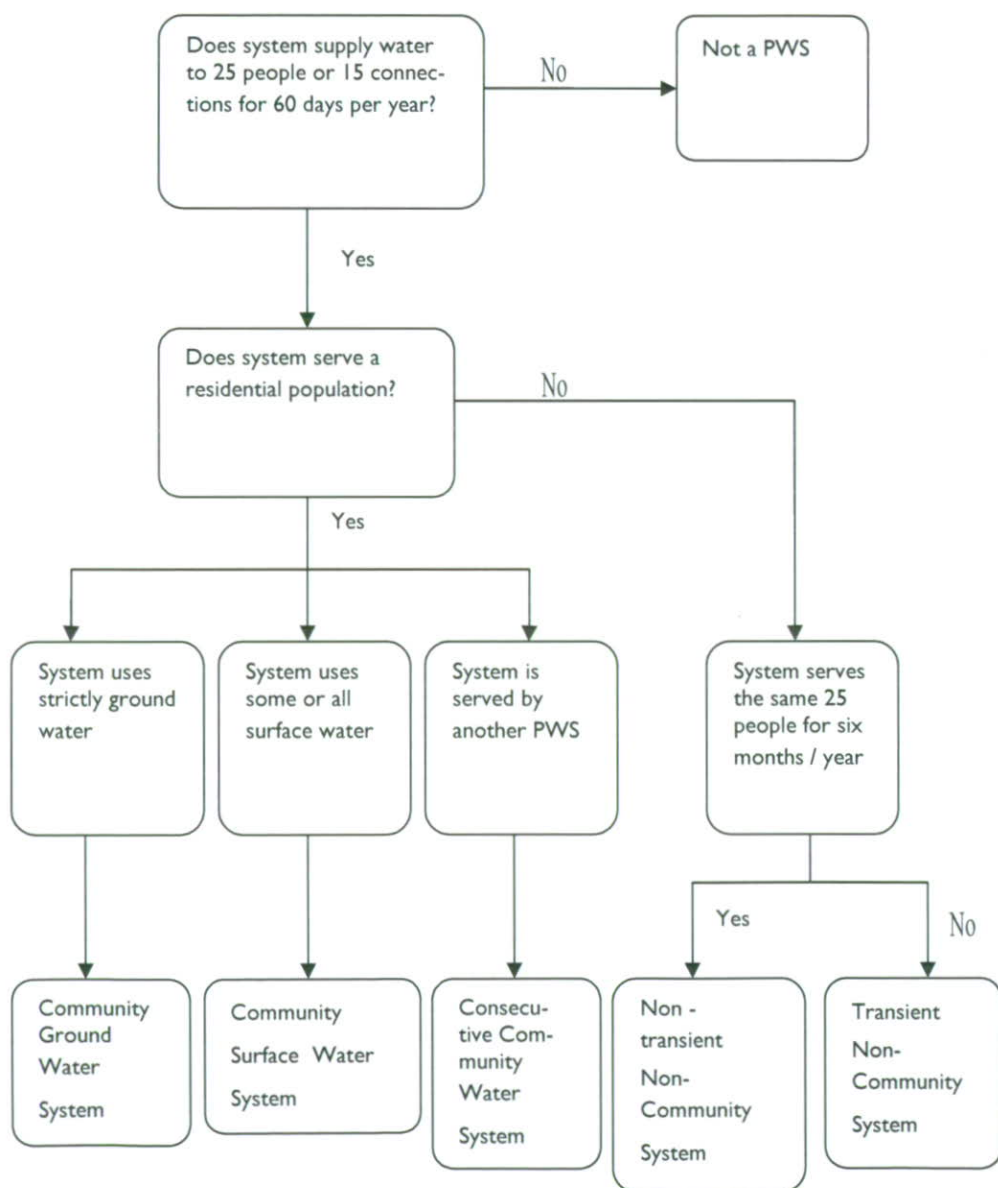
To contact the Pierre Office

Phone: 605 773-3754

Email: denrinternet@state.sd.us



Public Water System Determination Flow Chart





Resource Agencies

Various funding programs are available for improvements that may be needed to assist your water system. Among the commonly used programs are:

Consolidated Water Facilities Construction Program (CWFCP)

Department of Environment and Natural Resources

Joe Foss Building

523 East Capitol

Pierre, SD 57501-3181

605 773-3151

Community Development Block Grant Program (CDBG)

The Governor's Office of Economic Development

Rural Community Development Division

711 East Wells Avenue

Pierre, SD 57501-3369

605 773-5032

Water and Waste Disposal Loans and Grants

Rural Development Administration

(Farmers Home Administration)

Federal Building, Room 308

200 4th Street SW

Huron, SD 57350

605 353-1491



Hotlines and Additional Information

- EPA safe drinking water hotline <http://www.epa.gov>
800 426-4791
- Department of Environment and Natural Resources (DENR)
800 GET-DENR
- South Dakota Department of Environment and Natural Resources Drinking Water program <http://www.state.sd.us/denr/des/drinking/dwprg.htm>
Mark Mayer, Administrator
523 East Capitol
Pierre, SD 57501
Phone: 605 773-3754
Fax: 605 773-5286
- National Sanitation Foundation International www.nsf.org
- Division of Emergency Management, Duty Officer 605 773-3231
- FBI (to report an act of terrorism) 612 376-3200
- Bioterrorism hotline (to report an unusual illness or unexplained death)
800 592-1861 or 605 773-3536
- Chemtree (a 24-hour emergency response communication service)
800 424-9300
- Chem-Tel, Inc. (a 24-hour emergency response communication service)
800 255-3924
- Infotrac (a 24-hour emergency response communication service)
800 535-5053
- 3E Company (a 24-hour emergency response communication service)
800 451-8346



Definitions

Action Level: The level of lead or copper which, if exceeded, triggers treatment or other requirements that a water system must follow.

Acute Health Effect: An immediate (i.e. within hours or days) effect that may result from exposure to certain drinking water contaminants (e.g., pathogens).

Aquifer: A natural underground layer, often of sand or gravel, that contains water.

Best Available Technology: The water treatment(s) that EPA certifies to be the most effective for removing a contaminant.

Chronic Health Effect: The possible result of exposure over many years to a drinking water contaminant at levels above its Maximum Contaminant Level.

Coliform: A group of related bacteria whose presence in drinking water may indicate contamination by disease-causing microorganisms.

Community Water System: A water system which supplies drinking water to 25 or more of the same people year-round in their residences.

Compliance: The act of meeting all state and federal drinking water regulations.

Contaminant: Anything found in water (including microorganisms, minerals, chemicals, radionuclides, etc.) which may be harmful to human health.

Cryptosporidium: A microorganism commonly found in lakes and rivers which is highly resistant to disinfection. Cryptosporidium has caused several large outbreaks of gastrointestinal illness, with symptoms that include diarrhea, nausea, and/or stomach cramps. People with severely weakened immune systems (that is, severely immuno-compromised) are likely to have more severe and more persistent symptoms than healthy individuals.

Disinfectant: A chemical (commonly chlorine, chloramine, or ozone) or physical process (e.g., ultraviolet light) that kills microorganisms such as bacteria, viruses, and protozoa.

Distribution System: A network of pipes leading from a treatment plant to customers' plumbing systems.

Exemption: State or EPA permission for a water system not to meet a certain drinking water standard. An exemption allows a system additional time to obtain financial assistance or make improvements in order to come into compliance with



Definitions

the standard. The system must prove that: (1) there are compelling reasons (including economic factors) why it cannot meet a Maximum Contaminant Level or Treatment Technique; (2) it was in operation on the effective date of the requirement, and (3) the exemption will not create an unreasonable risk to public health. The state must set a schedule under which the water system will comply with the standard for which it received an exemption.

Finished Water: Water that has been treated and is ready to be delivered to customers.

Giardia lamblia: A microorganism frequently found in rivers and lakes, which, if not treated properly, may cause diarrhea, fatigue, and cramps after ingestion.

Ground Water: The water that systems pump and treat from aquifers (natural reservoirs below the earth's surface).

Health Advisory: An EPA document that provides guidance and information on contaminants that can affect human health and that may occur in drinking water, but which EPA does not currently regulate in drinking water.

Inorganic Contaminants: Mineral-based compounds such as metals, nitrates, and asbestos. These contaminants are naturally-occurring in some water, but can also get into water through farming, chemical manufacturing, and other human activities. EPA has set legal limits on 15 inorganic contaminants.

Maximum Contaminant Level (MCL): The highest level of a contaminant that EPA allows in drinking water. MCLs ensure that drinking water does not pose either a short-term or long-term health risk. EPA sets MCLs at levels that are economically and technologically feasible. Some states set MCLs which are more strict than EPA's.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant at which there would be no risk to human health. This goal is not always economically or technologically feasible, and the goal is not legally enforceable.

Microorganisms: Tiny living organisms that can be seen only with the aid of a microscope. Some microorganisms can cause acute health problems when consumed in drinking water. Also known as microbes.

Milligram per Liter (mg/L): A measurement of concentration of a contaminant.



Definitions

Monitoring: Testing that water systems must perform to detect and measure contaminants. A water system that does not follow EPA's monitoring methodology or schedule is in violation, and may be subject to legal action.

Non-Transient, Non-Community Water System: A water system which supplies water to 25 or more of the same people at least six months per year in places other than their residences. Some examples are schools, factories, office buildings, and hospitals which have their own water systems.

Organic Contaminants: Carbon-based chemicals, such as solvents and pesticides, which can get into water through runoff from cropland or discharge from factories. EPA has set legal limits on 56 organic contaminants.

Pathogen: A disease-causing organism.

Primacy State: A State that has the responsibility and authority to administer EPA's drinking water regulations within its borders. The State must have rules at least as stringent as EPA's.

Public Notification: An advisory that EPA requires a water system to distribute to affected consumers when the system has violated Maximum Contaminant Levels or other regulations. The notice advises consumers what precautions, if any, they should take to protect their health.

Public Water System (PWS): Any water system which provides water to at least 25 people for at least 60 days annually. There are more than 170,000 PWSs providing water from wells, rivers and other sources to about 250 million Americans. The others drink water from private wells. There are differing standards for PWSs of different sizes and types.

Radionuclides: Any man-made or natural element that emits radiation and that may cause cancer after many years of exposure through drinking water.

Raw Water: Water in its natural state, prior to any treatment for drinking.

Sample: The water that is analyzed for the presence of EPA-regulated drinking water contaminants. Depending on the regulation, EPA requires water systems and states to take samples from source water, from water leaving the treatment facility, or from the taps of selected consumers.



Definitions

Sanitary Survey: An on-site review of the water sources, facilities, equipment, operation, and maintenance of a public water systems for the purpose of evaluating the adequacy of the facilities for producing and distributing safe drinking water.

Secondary Drinking Water Standards: Non-enforceable federal guidelines regarding cosmetic effects (such as tooth or skin discoloration) or aesthetic effects (such as taste, odor, or color) of drinking water.

Sole Source Aquifer: An aquifer that supplies 50 percent or more of the drinking water of an area.

Source Water: Water in its natural state, prior to any treatment for drinking.

Surface Water: The water that systems pump and treat from sources open to the atmosphere, such as rivers, lakes, and reservoirs.

Transient, Non-Community Water System: A water system which provides water in a place such as a gas station or campground where people do not remain for long periods of time. These systems do not have to test or treat their water for contaminants which pose long-term health risks because fewer than 25 people drink the water over a long period. They still must test their water for microbes and several chemicals.

Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

Turbidity: The cloudy appearance of water caused by the presence of tiny particles. High levels of turbidity may interfere with proper water treatment and monitoring.

Variance: State or EPA permission not to meet a certain drinking water standard. The water system must prove that: (1) it cannot meet a Maximum Contaminant Level, even while using the best available treatment method, because of the characteristics of the raw water, and (2) the variance will not create an unreasonable risk to public health. The State or EPA must review, and allow public comment on, a variance every three years. States can also grant variances to water systems that serve small populations and which prove that they are unable to afford the required treatment, an alternative water source, or otherwise comply with the standard.

Violation: A failure to meet any state or federal drinking water regulation.



Definitions

Vulnerability Assessment: An evaluation of drinking water source quality and its vulnerability to contamination by pathogens and toxic chemicals.

Watershed: The land area from which water drains into a stream, river, or reservoir.

Wellhead Protection Area: The area surrounding a drinking water well or well field which is protected to prevent contamination of the well(s).

500 copies of this document were printed by DENR at a cost of \$1.10 per copy.



Printed on Recycled Paper with Soy Ink



Protecting South Dakota's Tomorrow... Today

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